2 INFORMATION SYSTEMS EPISTEMOLOGY: AN HISTORICAL PERSPECTIVE

Rudy A. Hirschheim
London School of Economics
United Kingdom

This chapter provides an historical background to the development of research methodology.

Abstract

There are some important issues associated with knowledge and its acquisition which, if realized, could make quite a shift in our thinking about what constitutes valid research. They have a rich historical tradition and are fundamental to our understanding of nature and society. This paper takes an historical perspective on information systems epistemology; in so doing, it hopes to expose some of the hidden assumptions which lie behind our conception of valid research and valid research methods.

Introduction

The information systems (IS) community is a loosely connected group of individuals trying to advance the state of IS knowledge. Many of us are concerned that the state of IS knowledge is not what it should or could be. Moreover, we feel a large part of the problem is directly related to what constitutes valid research. We have attended this colloquium to explore the issue of whether there is a need for an IS research paradigm shift or at least what alternatives to the current orthodoxy exist. I should like, in this paper, to offer my thoughts on the salient concepts the colloquium is trying to address, viz. information systems epistemology. It is my contention that IS epistemology draws heavily from the social sciences because information systems are, fundamentally, social

rather than technical systems. Thus, the scientific paradigm adopted by the natural sciences is appropriate to information systems only insofar as it is appropriate for the social sciences. If one contends that the social sciences embrace an epistemology which is different from their natural science counterparts, then so too is the case for IS. I should like to argue in favor of such a contention. To do so requires a brief excursion into the history of social science epistemology.

Fundamental Aspects of Epistemology

Epistemology refers to our theory of knowledge; in particular, how we acquire knowledge. There are two basic points which need to be looked at: (l) what is knowledge, and (2) how do we obtain "valid" knowledge. Let me address each in turn. One, knowledge (which I consider to be roughly synonymous with understanding) has been an integral part of life and has been sought by humans since the dawn of mankind. The Greeks chose to classify knowledge into two types: *doxa* (that which was believed to be true) and *episteme* (that which was known to be true). Science, they believed, was the process of inquiry which transformed doxa into episteme. Of course a major philosophical problem is how do (or could) we know something is true, i.e., how do we really know what we know? The Sophists were perhaps the first to raise the question and this has troubled philosophers for centuries. The problem is a straightforward one: since man cannot transcend his language and cultural system, he cannot obtain any absolute viewpoint. The solution is to define knowledge in an alternative fashion, one where knowledge is only "asserted," It is supported by evidence (usually of an empirical variety), and knowledge claims are conceived of in a probabilistic sense. Knowledge is therefore not infallible but conditional—it is a societal convention and is relative to both time and place. Knowledge is a matter of societal (or group) acceptance. The criteria for acceptance are an agreed set of conventions which must be followed if the knowledge is to be accepted by society. The set of conventions are not arbitrary; they are well thought out and have historically produced knowledge claims which have withstood the test of time. In any society, there are a myriad of knowledge claims: those which are accepted are those which can be supported by the forces of the better argument. They are an agreed best understanding that has been produced at a particular point in time. Such knowledge claims may become un-accepted as further information is produced in the future.

The second point—how knowledge is acquired—is more polemical. This is the role of science. Because it is related to knowledge, it too is based on societal (or communal) agreement. Science is a convention, related to societal norms, expectations, values, etc. In its most conceptual sense, it is nothing more than the search for understanding. It would use whatever tools, techniques and approaches which are considered appropriate for the particular subject matter under study. The consequence of this conception of science is that virtually any "scholarly" attempt at acquiring knowledge could be construed to be "science." The distinction between science (normal science) and non-science or quasi-science (pseudo-science) is therefore blurred. In the West, however, this line of demarcation is relatively clear: for something to be considered scientific, it must use the agreed set of conventions—the scientific method. It is the manifestation of the positivistic conception of science/inquiry or "positive science" and has a long history of

providing an accepted understanding of nature. In other cultures, alternative forms of inquiry are considered appropriate, for example, meditation, consulting an oracle, etc. We might consider this form of knowledge acquisition "unscientific" because it does not match our conception of science. But since science is simply the process by which an understanding is obtained, we cannot necessarily dismiss these attempts as unscientific because our culture is different from others. If a particular process is widely considered appropriate, then that is science. According to Snyder (1978), "science is something that people do. It is not a particular set of assertions or theories, but a set of activities that may or may not produce organized theories."

One might argue that science requires certain conventions which alternative forms of inquiry do not follow, such as replicability, empirical in nature, and so on. Meditation, therefore, would likely be unacceptable to us as a scientific method irrespective of its acceptance elsewhere. These conventions are our conventions, based on our past experiences at acquiring knowledge. The conventions we agree to are those that have proved successful in the past. If, however, the conventions and therefore our scientific process cease to be successful, then it would be time to reconsider. This appears to be precisely what is happening in our attempt at obtaining an understanding of human and social behavior. Chinks have begun to appear in the armor of the accepted scientific method leading many to question its validity in many disciplines (even, for example, in physics). The present colloquium is a good indication of exactly this point. We are here because we want to have a better understanding of how to advance the state of IS knowledge. Many of us are concerned that the present accepted research methods are no longer appropriate for the subject of study—indeed, they may never have been. What is needed is a fresh look at the field; in particular what is the most appropriate epistemological stance.

Science and Method

As was stated earlier, information systems—because they are largely human or social in nature—share all the difficulties associated with the social sciences. Our accepted process of inquiry, involving the use of the "scientific method," has yielded many knowledge claims but most do not have widespread community acceptance. This is hardly surprising given the often contradictory findings of our studies. Roy Payne (1976) makes the insightful point that in all the years of organizational behavior research, only four knowledge claims may have any "real" validity or acceptance. In fact, many social scientists are convinced that the reason we have made so little progress is our conception of science. It is too limiting and not appropriate for the subject of study, i.e., human beings. The "scientific method" may be appropriate for the natural sciences but not necessarily for the social sciences.

A number of writers have proposed the need to change our conception of science. Some have suggested that science may be mare appropriately described in terms of problem or puzzle solving (cf. Kuhn 1970; Toulmin 1972; Laudan 1977). Science, in this conception, is simply a problem solving activity which uses certain conventions in the process. If this posture is adopted, many of the problems associated with research methodologies disappear since the emphasis shifts away from aspects such as correla-

tions, statistical significance and the like. One is simply looking for an appropriate way to solve a particular problem (Laudan 1977). Popper (1972) has a similar conception. He states: "The activity of understanding is, essentially, the same as that of problem solving." If such a conception is embraced, then science has less to do with specific methods, and more to do with practical solutions to problems. This relates to what was said earlier about the blurring of science and pseudo- or quasi-science. Some choose to view the process of problem solving as a craft (cf. Pettigrew 1985). Within this context, the researcher should be viewed as a craftsman or a tool builder, one who builds tools, as separate from and in addition to, the researcher as tool user. Unfortunately, it is apparent that the common conception of a researcher/scientist is different. He is someone who uses a particular tool (or a set of tools). This I feel is undesirable, because if scientists are viewed in terms of tool users rather than tool builders, then we run the risk of distorted knowledge acquisition techniques—for an old proverb states: "for he who has but one tool, the hammer, the whole world looks like a nail." We certainly need to guard against such a view, yet the way we practice "science" leads us directly to such a view.

There are many alternative modes of inquiry but they are considered ascientific by the research community. Yet it is precisely these alternative methods which may allow us to acquire a better understanding of the human realm, and thus should be considered scientific. The difficulty in changing the community's conception of science, however, is legendary.

Popper (1963), for example, decries pseudo-science as valueless. For Popper, pseudo-science is one or more knowledge claims which cannot be refuted. He gives three examples: Marx's historical analysis, Freud's psycho-analysis, and Adler's "individual psychology." Popper notes these theories cannot be considered science since any and all data can be fit into the theories—they could never be refuted. Einstein's theory of relativity was a pseudo-science at one time, but it has now become accepted as proper science. It is interesting to note that the examples of what Popper calls pseudo-science are all in the human realm. For something to be considered science, it has to follow certain conventions. It makes no difference whether the subject of study is human or non-human. If the conventions cannot be met, then what is produced is at best pseudo-science. It is interesting to speculate whether the whole of social science itself might be considered pseudo-science under such a view.

In the West, there is a fairly strict conception of science. It is based on positivism: an epistemology which posits beliefs (emerging from the search for regularity and causal relationships) and scrutinizes them through empirical testing. Positivism has a long and rich historical tradition. It is so embedded in our society that knowledge claims not grounded in positivist thought are simply dismissed as ascientific and therefore invalid. Because of the dominance of positivism, it is imperative that we understand what it is, why it is at the roots of our knowledge acquisition attempts, and what are the alternatives.

Positivism has been defined by numerous individuals over the years. Kolakowski (1972), for example, states that positivism embraces a four point doctrine: (1) the rule of phenomenalism—which asserts that there is only experience; abstractions be they "matter" or "spirit," have to be rejected; (2) the rule of nominalism—which asserts that words, generalizations, abstractions, etc., are linguistic phenomena and do not give new insight into the world; (3) the separation of facts from values; and (4) the unity of the scientific method. Burrell and Morgan (l979) define it as an epistemology "which seeks

to explain and predict what happens in the social world by searching for regularities and causal relationships between its constituent elements. For the purpose of my discussion, positivism will be summarized as being based on five pillars:

(1) Unity of the scientific method
(2) Search for human causal relationships
(3) Belief in empiricism
(4) Science (and its process) is value-free
(5) The foundation of science is based on logic and mathematics

One, unity of the scientific method means that the accepted approach for knowledge acquisition (the scientific method) is valid for all forms of inquiry. It does not matter whether the domain of study is animate or inanimate objects; human, animal, or plant life; physical or non-physical phenomena; etc. Two, the search for human causal relationships reflects the desire to find regularity and causal relationships among the elements of study. The process used is based on reductionism, where the whole is further and further reduced into its constituent parts. Three, the belief in empiricism refers to the strongly held conviction that the only valid data is that which is experienced from the senses. Extrasensory experience, conscious and unconscious organizing apparatus, subjective perception, and the like, are not considered acceptable. Four, science and its process are value-free reflects the belief that there is no intrinsic value position in science. The undertaking of science has no relationship to political, ideological, or moral beliefs. It transcends all cultural and social beliefs held by the scientist. Five, logic, and more generally, mathematics provide the foundation of science. They provide a universal language and a formal basis for quantitative analysis, an important weapon in the search for causal relationships.

Positivism also embraces a particular ontological position. (Ontology refers to the nature of the world around us; in particular, that slice of reality which the scientist chooses to address.) The position adopted by the positivist is one of realism. It postulates that the universe is comprised of objectively given, immutable objects and structures. These exist as empirical entities, on their own, independent of the observer's appreciation of them. This contrasts sharply with an alternative ontology, that of relativism or instrumentalism. It holds that reality is a subjective construction of the mind. Socially transmitted concepts and names direct how reality is perceived and structured; reality therefore varies with different languages and cultures. What is subjectively experienced as an objective reality exists only in the observer's mind. (The latter ontological stance is the one supported by anti-positivism which will be described in more detail later in the paper.)

Through the centuries, positivism has enjoyed great success. It has had an especially happy relationship with the physical sciences where a tremendous growth in knowledge has been experience. Its application in the social sciences has, however, been less than spectacular. Throughout history, individuals have sought to apply positivism to the human realm, bolstering or modifying its conception as necessary. Critics have surfaced to question its validity on numerous occasions. An historical perspective, in fact, provides an interesting view of the uneasy tension which has existed in the application of positivism in the social sciences. This perspective and tension I have tried to depict in Figure 1. The rationale for such a view comes from Perrow (1973). His structuring of the important developments of organizational behavior has provided the inspiration and

model for my treatment of social science epistemology. Polkinghorne (1983), Burrell and Morgan (1979), Scruton (1984), Brown, Fauvel and Finnegan (1981), Snyder (1978), and Clegg and Dunkerley (1984) have provided the details on the "key historical players."

In my attempt to structure the growth of epistemological thought, I have had to grossly simplify and perhaps misrepresent various philosophers' contributions. This was unavoidable. It is not possible to do justice to this subject in one paper. The purpose of this treatment is to provide an overview of the key epistemological issues facing IS researchers, something which I feel is long overdue. There has been little, if any, recognition of the importance of this subject. The only alternative epistemological treatment is found in Ivanov (1984). His historical perspective is summarized in Figure 2.

The Short and Glorious History of Information Systems Epistemology

The historical perspective depicted in Figure 1 divides the development of social science epistemology into four very loose stages with a fifth just beginning to emerge. It should be noted that this perspective reflects Western epistemological development only. As Snyder (1978) quite rightly points out, there was a parallel growth in the East which could be considered to be every bit as rich as our own, particularly in the classic period 600 BC–200 AD. I have chosen to begin the historical review in the 17th century because it was from this period on which has had the greatest influence on Western human science epistemology. This is not meant to understate the importance of the Greeks during the formative stages of epistemological development. Their contributions in the classic period, especially writers such as Pythagoras, Xenophanes, Heraclitus, Socrates, Plato, Aristotle, Euclid, and Ptolemy, are well known and appreciated. In fact, the writers appearing in the left half of Figure 1—termed the "forces of the believers"—and largely responsible for the development of positivist thought, can be traced back to the writings of Plato and Aristotle. The right half—termed the "forces of doubters"—and largely responsible for the development of alternatives to positivism, may be traced back to the Sophists (e.g., Hippias, Protagoras and Prodicus).

The four stages of the historical perspective are referred to as: (1) the arrival of positivism, (2) the entering of anti-positivism, (3) the re-entering of positivism (through logical positivism), and (4) the arrival of the contemporary critics. A fifth stage just currently emerging is that of post-positivism.

The Arrival of Positivism

The period 200-1000 AD is considered by most philosophers of science as the "dark age" of western science thought. The major area of intellectual activity during this period was theology. Questions about science were interpreted as questions about the nature of God. Scientific thought was greatly constrained by both political and religious forces. And although some of Plato's and Aristotle's writings had been translated into Latin, they were neither widely available nor known.

Forces of the Believers		**Forces of the Doubters**	
	17th Century		
	THE ARRIVAL OF POSITIVISM		
Bacon	1620		
Galileo	1632		
Descarte	1639		
Hobbes	1651		
Spinoza	1663		
Newton	1687		
Locke	1690		
	18th Century		
Leibniz	1710		
		1725	Vico
Hume	1748	1781	Kant
		1798	Fichte
	19th Century		
		1807	Hegel
Mill	1843		
Comte	1853		
Spencer	1873		
Mach	1886		
Avenarius	1888		
	ENTER ANTI-POSITIVISM		
		1844	Marx
		1876	Dilthey
		1879	Wundt
		1880	Bretano
		1889	Rickert
Pareto	1980	1890	James
		1892	Simmel
		1894	Windelband
Weber	1886	1896	Weber
Durkheim	1898		

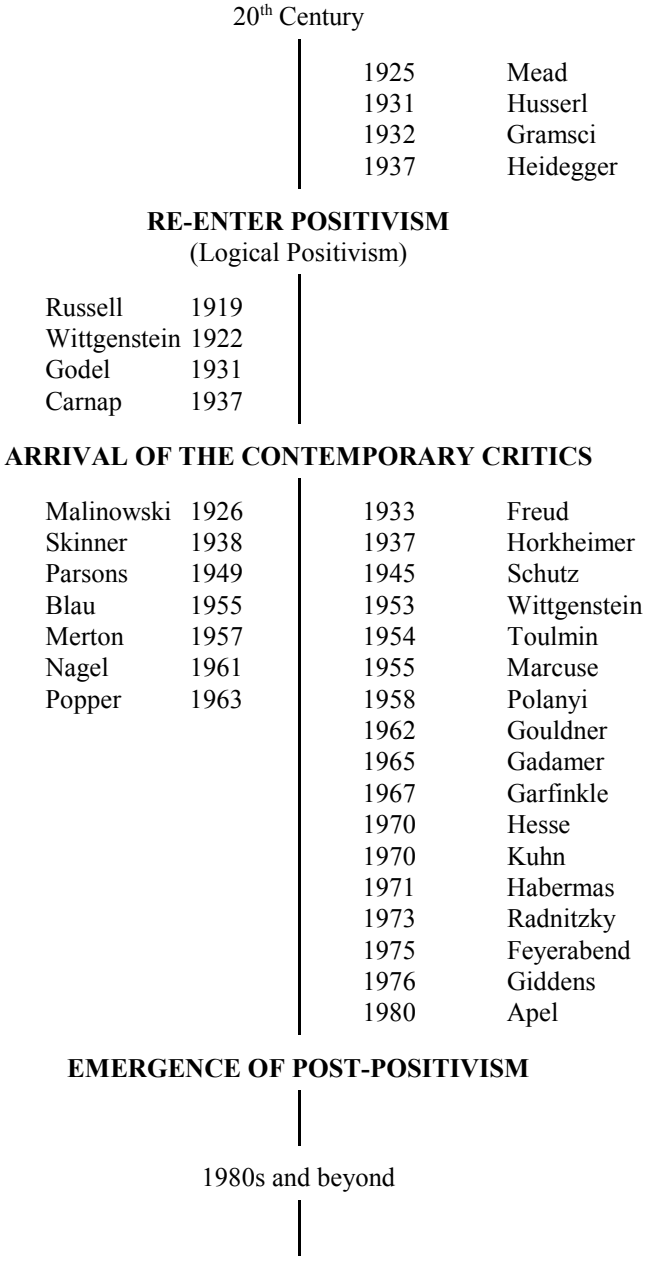
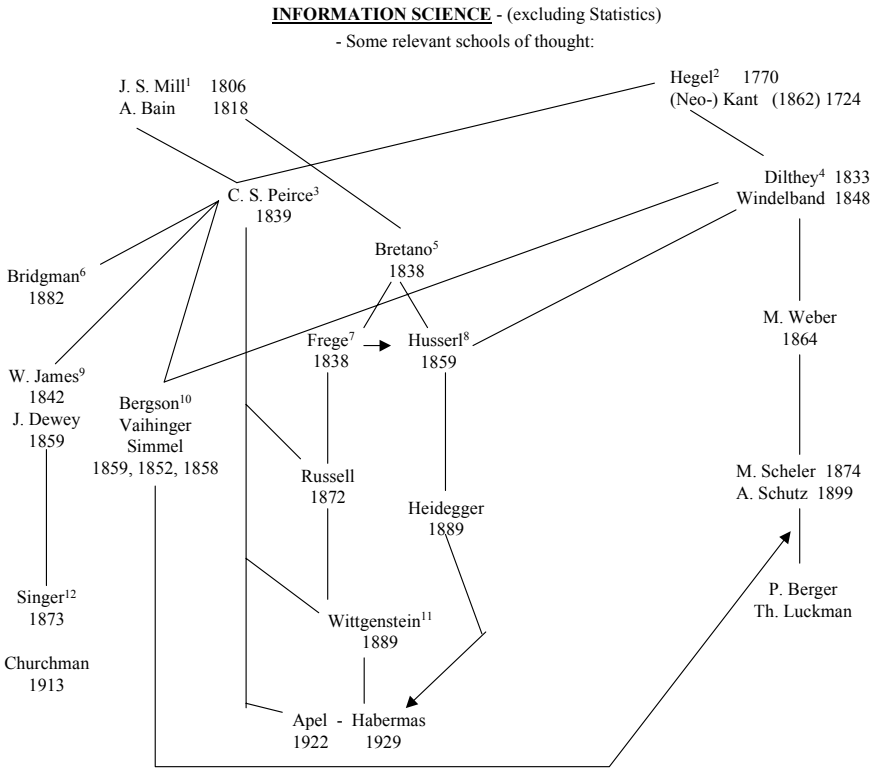


Figure 1. A Short History of IS Epistemology



1. Empiricism
2. Idealism
3. Pragmatism
4. Geisteswiss
5. Psychologism
6. Operationism
7. Logicism
8. Phenomenol.
9. Radical empiricism
10. Vitalism
11. Analytical hil.
12. Empirical idealism

Source:

K. Ivanov (1984)

Figure 2

During the latter part of the 12th century, the Muslims allowed European scholars to have access to the entire body of Greek writings, which were then translated into Latin. Thomas Aquinas in the 13th century elaborated on Aristotle's work in physics and brought to the attention of the European scholars of the time the importance of Aristotle's writings. He was nevertheless constrained by the Church and needed to show how the Aristotelian notion of science was consistent with the Church's teachings and beliefs. Nicholas Copernicus, in the early part of the 16th century, elaborated upon the newly translated Pythagorean works and postulated that the sun, rather than the earth, was at the center of the planetary motion.

The 16th and early 17th centuries saw a great awakening in Europe on science. Critical debate about the Church and science burgeoned forward. Plato's work became influential, Copernicus challenged the Aristotelian world view supported by the Church and others of the so-called "scholastic" period, Luther and Calvin broke away from the established Church, and Galileo and Kepler attacked the accepted view about planetary motion. The Inquisition sought to reaffirm the Church's position but, by the 17th century, it was clear science would no longer be the sole province of the Church. Its intellectual authority had been irreparably damaged, and with it the door was opened for the development of positivist inquiry.

Foremost among the individuals to shape positivist thought was Rene Descartes (1596-1650). With his treatise *Discourse on Method* (1639), he felt that mathematics was the sole base on which a general theory of nature could be founded. All properties of material objects could be reduced to mathematical form. Descartes' most influential doctrine was the separation of mind (soul substance) and matter (physical substance). He felt one could be studied without reference to the other. The former would be left to theologians, the latter would constitute the subject of study for science. This distinction between mind and soul on the one hand, and the physical world, on the other, laid the foundation of positivist thought for the next three centuries. Moreover, it was instrumental in the way human beings were to be studied. Out of Descartes' doctrine grew the mind-body division: the mind (the self) which was identified with conscious thought (awareness), and the body which was an essentially mechanistic object. According to Koestler (1969), this caused the "Cartesian catastrophe"—the combination of the two doctrines that there is nothing in the mind which we are not aware of, and that the mind and body are two distinct entities. Nevertheless, Descartes separation of mind and body has had an enormous effect on the development of positivist thought, and its application (and success) in the physical sciences. As Snyder (1978) notes, "the Cartesian framework carried natural science as far as it could in the attempt to understand nature as something wholly distinct from the human observer."

The movement toward positivism and empiricism burst forth during the late Renaissance period. Francis Bacon's (1620) *Novum Organum* championed the inductive-experimental method as a replacement for Aristotle's methods. Galileo's (1632) *The Dialogue Concerning Two Chief World Systems* noted that nature was consistent, not random. It could be seen in a systematic way and could be described using mathematics. Moreover, he suggested teleological explanations should be abandoned; they were not needed to explain nature nor its "purpose." Isaac Newton's (1687) *Mathematical Principles of Natural Philosophy* stressed the need for experimental confirmation of these. This was useful for a general understanding of the natural world. The critical person of the age though, was probably Thomas Hobbes (1637), who was one of the first to state that humans could be studied using the same scientific methods as physical phenomena. Hobbes, in the *Leviathan* (1651), objected to Descartes' separation of mind and matter, saying mind was simply part of nature and could be studied as such. He posited there was one universe made up of matter in regular motion which could be described by mathematical formulas. Studying human phenomena was no different from studying any other.

Two centuries later, positivism as an approach to human knowledge acquisition emerged as a more coherent theme. Prominent among individuals of this era was Auguste

Comte (1798-1857). He said the study of human phenomena should reflect methods used in physical science. "Positive" science was to be undertaken. The science of sociology—for discovering the laws of human behavior—would be pre-eminent. It would be used to establish a perfect society based on these laws of behavior.

Herbert Spencer (1820-1903), a "positivist" in Comtean tradition, developed a biological analogy for sociology. Much of his work was based on the application of Darwin's theory of evolution to society. In *The Study of Sociology* (1873), he viewed society as a self-regulating system which could be studied and understood by the examination of its parts and how they interrelated. Evolution was the key to sociology for Spencer.

John Stuart Mill's (1843) *System of Logic* provided a philosophical and logical foundation for empiricism as the ground of knowledge. For Mill, empiricism was as appropriate for the social sciences as the physical sciences. He wrote: "The backward state of the moral sciences can only be remedied by applying to them the methods of physical science duly extended and generalized." Mill felt, however, that although the study of human nature should aspire to be like the exact (natural) sciences, they never would be

.

> The science of human nature...falls far short of the standard of exactness now realized in Astronomy; but there is no reason that it should not be as much a science as Tidology l2, or as Astronomy was when its calculations had only mastered the main phenomena, but not the perturbations (from Brown, Fauvel and Finnegan 1981). [Note the similarity of views on this point between Mill and Popper as discussed earlier.]

Ernst Mach was largely responsible for the rapid growth of empiricism that took place in the 20th century. It was his advocation that knowledge should be limited to sensations, published in *The Analysis of Sensations* (1886), which gave empiricism its base. Mach contended that the only accurate description of the natural world is that which is experienced by one or more of the five senses. He noted that while people may linguistically call the same object something different, their sense impressions of it are the same. For Mach, it is only man's sensations which are absolute and certain. Science, therefore, can only attain certainty if it is built on sensations.

Richard Avenarius' (1888) *Critique of Pure Experience* noted that pure experience was the sole admissable source of knowledge. Pure perception, "the sensa," was necessary; metaphysical ingredients had to be eliminated.

Emile Durkheim (1858-1917), although often critical of Comte, was influenced by him greatly, particularly in his notion of the objective reality of "social facts." He also incorporated Spencer's organic analogy into his own analysis of society and its institutions. But Durkheim wanted to go beyond this; he stressed the need for causal analysis in addition to functional analysis. Like Comte and Spencer, he borrowed his methodology from the natural sciences: distinguishing between causes, functions and structures. In *The Rules of Sociological Method* (1936), Durkheim noted the importance of causation. He wrote: "when the explanation of a social phenomenon is undertaken, we must seek separately the efficient cause which produces it and the function it fulfills."

Vilfredo Pareto (1848-1923) was an economist who planned to apply scientific methods to the social sciences, "to seek experimental reality." He used a social systems model based on the notion of equilibrium, thus basing his works on physical sciences instead of the biological analogy of Durkheim and Spencer.

During this time period, there was a converging of three philosophical traditions: naturalism (all phenomena can be explained in terms of natural causes and laws, without attributing moral, spiritual or supernatural significance to them); empiricism (that the experiences of the senses is the only source of knowledge); and positivism.

Enter Anti-Positivism

In the latter part of the 19th century, the anti-positivists entered; they were particularly worried that the positivists position failed to appreciate the fundamental experience of life in favor of physical and mental regularities. They neglected meaningful experience, which was really the defining characteristic of human phenomena.

A number of individuals, such as Rickert and Windelbrand of the neo-Kantian Baden School, Johann Droysen and George Simmel, proffered the need for something apart from positivism—hence the term anti-positivism. Perhaps the greatest exponent of this was William Dilthey. He suggested that individuals do not exist in isolation, they need to be understood in the context of their cultural and social life. This is the major theme that Dilthey and others developed. Further, the notion of "*verstehen*," which notes that humans recognize and understand meaning, became manifest in the writings of people like Wilhelm Wundt, Franz Brentano, and in particular Edmund Husserl. William James in the early 20th century, with his notion of radical empiricism, and George Herbert Mead, in the 1930s, with his development of symbolic interaction, played important roles in the development of anti-positivist thought.

Burrell and Morgan (1975) capture the spirit of anti-positivists. They write:

> In addition to focusing attention upon the essentially complex and problematic nature of human behavior and experience, the work of this generation of theorists returned to the basic problems of epistemology identified by Kant, which confronted both the natural and social sciences. The positivist position came to be seen as increasingly unsatisfactory and problematic on at least two counts. First, within the natural sciences (Naturwissenschaften) it became clear that human values intruded upon the process of scientific inquiry. It was evident that scientific method could no longer be regarded as value-free; the frame of reference of the scientific observer was increasingly seen as an active force which determined the way in which scientific knowledge was obtained. Within the realm of the cultural sciences (Gelsteswisenschaften) a second set of difficulties were also seen as arising, since their subject matter was distinguished by its essentially spiritual character. It was realized that man as an actor could not be studied through the methods of the natural sciences, with their concern for establishing general laws. In the cultural sphere, it was held, man

> was not subject to law in the physical sense, but was free....As a result of this disenchantment with sociological positivism, idealism assumed a new lease of life.

Anti-positivist thought can be traced back to the following writers.

Giambattista Visco's (1725) *The New Science* offered an alternative to the empirical approach stating that human phenomena knowledge can be gained through the study of our history. He felt the laws of historical development are laws of the structuring of meaning. He called for a study of the forms of social life developed by and created through human meaning.

Immanual Kant (1729-1804) has been called by Scruton (1984) "the greatest philosopher since Aristotle." In his classic work *Critique of Pure Reason* (1781), Kant outlined the problems associated with the empiricism of Locke and Hume, and the rationalism of Descrates, Spinoza, and Leibniz. He believed the former placed primacy on experience to the detriment of understanding; the latter was the reverse. Neither could therefore provide a coherent theory of knowledge. For Kant, knowledge is achieved through a synthesis of concept (understanding) and experience. He termed this synthesis "transcendental," which gave rise to the philosophy of "transcendental idealism." In this philosophy, Kant noted a difference between theoretical and practical reason. The former dealt with the knowledge of appearances (realm of nature); the latter with moral reasoning (issues). Whilst Kant made no distinction between the physical reason human science (he felt both were of the realm of nature), he left the door open for others to consider cultural phenomena within the realm of practical reason since cultural phenomena were expressions of social meanings. Thus grew the Neo-Kantians, who considered *verstehen* a legitimate source of knowledge. The Baden School was the leading proponent of such a contention.

Johann Fichte (1762-1814), a follower of Kant, proposed a version of subjective idealism hinged upon the notion that human consciousness is a never ending stream of ideas, images and concepts which unite to form an external world. Fichte reasoned that to understand this external world one must understand the human stream of consciousness. His work has influenced much of contemporary
social theory and philosophy.

G. Hegel (1771-1831), in his *The Phenomenology of Mind* (1807), postulated that knowledge was obtained through "dialectics." According to Scruton (1984), this is a term first used by Plato to describe the method of Socrates to obtain philosophical truth through disputation. Kant had also used the term, but in a somewhat obscure way to describe the propensity to fall into contradictions. Hegel used it to refer to a method whereby truth is discovered by a progression from "inadequate concepts" to more and more "adequate" ones. Scruton defines it thus:

> The dialectical process is...as follows: a concept is posited as a starting point. It is offered as a potential description of reality. It is found at once that, from the standpoint of logic, this concept must bring its own delegation with it: to the concept, its negative is added automatically, and a "struggle" ensues between the two. The struggle is resolved by an ascent to the higher plane from which it can be comprehended and

> reconciled: this ascent...generates a new concept out of the ruins of the last. This new concept generates its own negation, and so the process continues, until, by successive applications of the dialectic, the whole of reality has been laid bare.

This attractive metaphor has had a great influence on the philosophical thought of the past two centuries. In terms of social science thought, Hegel (like Fichte) saw human consciousness as crucial to the understanding of the nature of society. Hegelian theory attempts to explain how human knowledge passes through several forms of consciousness, until finally a level of "absolute knowledge" is attained. When this level is reached, the individual is one with the "absolute spirit" of the universe. For Hegel, human existence is a constant interaction between the individual's consciousness and its object form, the external world. These form a dialectical relationship—two sides of one reality. Hegel envisioned a perfect society, where all were subservient to the same "absolute spirit," the state.

Karl Marx (1818-1883) expanded on Hegelian theory and placed the individual rather than an "absolute spirit" at the center of things. Marx argued that there existed no absolute above man. He and others of his day pointed out that the state and even religion were creations of man, not some "absolute spirit." Continuing this theses, he explained how individuals could create and shape their own society through self-consciousness. This concept of the "alienation of man" emphasized how societal constraints (man-made) were dominating the very being and nature of man. Later Marx diverted his attentions away from the idealist perspective to a much more realistic-oriented view of nautre and society.

Wihelm Diltney (1833-1911) was the principal architect of the anti-positivist movement. He believed in the need for empirical science to study human phenomena, but he disagreed with the positivists as to how humans should be studied. They needed to be viewed within the context of a "philosophy of life." Life cannot be understood as a machine, as Hobbes suggested. Life is what we experience in our activities and reflections as we live out our personal histories. Life cannot be understood by using the explanatory model that classifies events according to laws of nature. He wrote: "Because individuals do not exist in isolation, they cannot be studied as isolated units; they need to be understood in the context of their connections to cultural and social life" (quoted in Polkinghorne 1983).

Human scientists must seek to make explicit the principles of organization; the principles of "categories of life." They need to explicate the processes which make experience meaningful. Further, there is a need to explicate the processes, not seek causal connections. This differs from Mill's science, which sought to trace causal genesis and to state the laws of explanation. Dilthey sought to uncover the structues of meaning.

Dilthey also noted the need to extend the notion of "empirical" as used by the positivists. Their position implied that what is perceived is the manifestation of physical objects, transmitted into consciousness by sensory apparatus. But there is another type of perception; that of recognizing meanings. When we read, we experience more than the visual sensation created by black marks on white paper; we perceive the meaning of the words and the message of the author. We *see* more than physical objects, we "perceive" meaning in the world. This is the notion of *verstehen*.

Johann Droysen (1858) noted a difference between physical and human science methods. The former used "explanation" methods, the later "understanding" (*verstehen*) methods. These provide two different kinds of knowledge.

Wilhelm Windelbang (1894) noted the existence of one realm, but it could be studied from two perspectives: "nomothetic" (law) which addressed Droysen's notion of explanation (physical causation); and "idiographic" (particular, distinct) (Droysen's *verstehen*), which attempts to identify meanings and specific characteristics. The human sciences, thus, were not a different realm but needed to be looked at through idiographic methods.

Heinrich Rickett (1889) saw the need to change from Dilthey's "human science" to "cultural science" since the former emphasized the study of individual experience to the detriment of the study of cultural aspects. He also noted that meaning cannot be understood except in terms of values. Values provide the meaning of individual events. He postulated that values are "universal and ahistoric," something with which Dilthey disagreed.

Georg Simmel (1858-1918) introduced the notion of "reciprocal effect." He noted the existence of two forms of social life: "content" relating to an individual's drives—love, hunger, etc.; and "actualizing forms" relating to reciprocal effects between individuals, e.g., cooperation, competition, and solidarity. Experience is thus made up of these two forms of social life. To understand experience, one must understand both forms.

He attempted an eclectic approach to sociological inquiry; a middleground between the theories of idealism and positivism. His middleground position strived for an analysis of human association and interaction. Simmel stressed the need for field study through interaction examing and analyzing the underlying reasons for societal behavior. Epistemologically, Simmel leaned toward the positivist approach as his methodology was definitely nomothetic.

Wilhelm Wundt (1879) (often considered the father of psychology) noted a difference between physiological psychology and fold psychology. The former was clearly in the positivist's camp, the latter only partially. Wundt, although a believer in positivist methods, split with Mach's conception of science in that he did not believe science must be limited to "sense" data (i.e., pure perception). Subjective data were necessary particularly for folk psychology which dealt with feelings, affects, and processes of volition, i.e., mental life. These were the higher operations of the mind.

Franz Brentano (1838-1917) believed the object of inquiry for psychology should be human experience in its fullness. He shared many of the ideals of the positists including the contention that psychology should be empirical. Brentanto, however, wanted to recognize a special kind of experience that was not allowed in traditional empiricism. He noted two classes of phenomena: physical and mental. The former could be dealt with traditional positivists' methods since they were the objects of direct sense perception; the latter could not as their primary characteristic was "intentionality."

Edmund Husserl (1859-1938) was the father of the phenomenological movement. He looked to the rationalist rather than empiricist tradition for help in understanding the organizing structures of consciousness. Husserl notes: "what creates our lived experience are the essential structures or ideas that order and give form to experience." His primary concern was with understanding the nature of these forms. To do this

required an addition to empirical science, viz. the establishment of a new rational science. The result was phenomenology, the science concerned with the essential structures of consciousness. Phenomenology is based on the "intuitive grasping of the essences" of phenomena. An essence is defined as that which is necessary for something to be recognized as that thing. Husserl realized that sense data do not appear independent of meaning, they are the result of a constitutive process within consciousness. Thus what is experienced are not essences but the result of the constitutive process. To uncover the essence, the phenomenologist must bracket away layer upon layer of the hidden structuring process which provide meaning to the experience. To express it differently, an essence "is that which is constant as the "given" of consciousness in the constitutive process; furthermore, the essence is what remains "identical" in all possible variations of what is being investigated" (Polkinghorne 1983). Essences are not physical entities, and cannot be studied as such. They are non-empirical and concerned more with "how" and "why" rather than "which" and "what." For Husserl, the validity of phenomenological research comes from the self-validation of an insight into the phenomenon's essence that is communicated clearly and completely to the community. Knowledge is a sort of "social intuition" rather than hard facts. Its acquisition recognizes that (a) human experience is largely intersubjective in nature and these essences can be communicated to others; and (b) the process of understanding essences is historic, clarity is gained over time through successive studies.

Max Weber (1864-1920) believed that there existed a distinction between "human action" and "human behavior." Action embraces behavior but is deeper in that the acting individual attaches a subjective meaning to his behavior. It is behavior guided by values and meanings. For Weber, meaning is not something which can be subjected to empirical observation. He thus distinguishes between two types of human understanding: "direct observational" and "explanatory." The former reflects an understanding of human action where the purpose of the action is obvious to the observer; the latter, where it is not. In explanatory understanding, the observer seeks an understanding of the action "by placing the act in an intelligible and more inclusive context of meaning." Weber felt that understanding and explanation were two sequential components of social science inquiry. Researchers first sought understanding which became the basis of explanation. Weber believed the process of interpreting social action had to be undertaken with the same precision as that found in the natural sciences. This belief, however, led Weber toward a more empirical and positivist conception of human science which perhaps is exemplified in his discussions of an "ideal type." It is a construct which permits the irrational behavioral elements of human action to be recognized. One simply compares the actual observed action with the ideal action. The difference is attributed to "irrational elements."

William James (1842-1910) in *Principles of Psychology* (1890) developed and advocated the position of radical empiricism. An outgrowth of Mach's ideas, James contended that science should include all phenomena which is directly experienced. He felt that there were organizing patterns of the conscious which interpreted and ordered what was directly experienced from the senses. These organizing or structuring patterns that form part of the organized nature of experience needed to be seen as part of direct experience and thus appropriate for inclusion in science.

George Herbert Mead (1880-1949) was the father of symbolic interaction. Mead noted the need for a methodology of human science which would recognize the importance of symbois and their significance in understanding human behavior. Symbolic interaction was his proposed approach to deal with these symbols. According to Mead, individuals do not respond directly to stimuli. Instead, they react to the meanings they assign (consciously or unconsciously) to these stimuli. Meanings do not emerge in isolation but are derived from social interaction. As such, they are shared amongst members of the group and provide general guidelines which govern social action. Mead noted that people modify their behavior in line with social influences. Their action is a result of an interplay between the psychological forces "I" and "me." To obtain an understanding of the action, Mead felt the social actor's own view of his world and the meaning of his behavior has, for him, had to be included.

Antonio Gramsci (1891-1937) blended features of structure and consciousness, philosophy with sciences, and subject with object. Gramsci was critical of the Marxism of his day; he felt it had lost its vital revolutionary quality due to the adoption of positivist notions and other ideals. He wanted a theory which would transcend the classical theories of philosophy (particularly the antinomies of voluntarism vs. determinism, idealism vs. materialism and subjectivism vs. objectivism). His goal was a world view theory; a "philosophy of praxis," as he termed it. Gramsci saw this philosophy as complete and all-encompassing: within it were all elements necessary for the sciences as well as political concerns of life.

Re-enter Positivism

In the 1920s, a movement to counteract the development of anti-positivist though emerged—it was Vienna Circle. Positivism re-entered (not that it ever really died). Its rejuvenation came primarily from the work of Bertrand Russell. The Circle took Russell's new logic, merged it with the positivism of Mach and the development was called the "received view." It is now commonly referred to as "logical positivism." Prominent members of the Circle were Carnap, Feigl and Godel. Other people associated with this movement, although not with from the Vienna Circle itself, were Carl Hempel, Hans Reichenbach and Alfred Ayer. Wittgenstein's *Tactatus Logico-Philosophicus* was the inspiration of the logical positivists. According to Giddens' (1978),

> the *Tractatus* influenced the growth of logical positivism particularly with respect to the argument for the distinction between the analytic and synthetic. There are no synthetic *a priori* judgements. Systems of logic or mathematics, deductively derived from axiom, are essentially tautological; any other general claim to knowledge is synthetic, which means that it can be counterfactually shown to be false.

The development of logical positivism (or neo-positivism as it is sometimes referred to) has had a great influence on today's notion of science. In fact, it is commonly considered to be the dominant epistemology of contemporary science. Although it has evolved over the past 60 years it is still firmly rooted in the positivist camp. Problems

arising with its held beliefs have caused refinements to be developed and changes made. For example, there has been a move away from the classic positivist position of phenomenalism (where the only acceptable data came from experience) to physicalism (where data is seen to emanate from the world and not merely private experience; intersubjective agreement on objects is allowed). This movement also gave rise to a name change: from logical positivism to logical empiricism. (The two terms are, however, used interchangeably.) Concomitantly, the move to physicalism signaled the end of the classic claim that knowledge had to be indubitable. It was now acknowledged that intersubjective agreement provided sufficient justification for knowledge.

A second refinement to logical positivism shifted the goal of science away from individual explanation (or laws) to theoretical networks of knowledge statements linked together through deductive logic and grounded in direct observation. The accepted real of inquiry included sense data and logical relationships. The purpose of scientific inquiry was to "rationalize reality." The fundamental model for scientific explanation was the deductive nomological model of Hempel and Oppenheim. Its widespread adoptance in the majority of research done today (i.e., using the hypothetico-deductive model) is visible proof of its impact.

There have been numerous individuals who played an important role in the adaptation and application of logical empiricism to the social sciences. Some of the more prominent ones are as follows.

Bronislaw Malinowski (1926) was instrumental in establishing the usefulness of field-work in research. He proposed the appropriate way of studying and understanding society was by analyzing the various parts and their role within a culture. In order to comprehend a social system, one needed to understand the functions which are performed. The term "functionalism" was coined by him to describe this approach. It had a definite positivist orientation.

B. E. Skinner (1938) is most immediately associated with behaviorist theory, where he did extensive research and analysis of stimulus and response. Skinner viewed man much like a machine, simply responding in a deterministic way to external stimuli. Very much a proponent of experimental methods used in the natural sciences, he disregarded subjective states of mind. His research resulted in the formulation of many universal laws and patterns about human behavior.

Another psychologist of logical positivist genre was Clark Hull, who attempted to build a theory of psychological learning. In his book *Hypnosis and Suggestibility: An Experimental Approach* (1973), Hull argued for a strict adherence to the hypothetico-deductive method, utilizing rigorous experimentally deductive reasoning. Postulates are formulated from which experimentally testable results are adduced and then subjected to rigorous experimental testing. Hull felt that psychology should be as objective a science as the physical sciences. The only way this could be done was through the embracing and use of the hypothetico-deductive method.

A. Radcliffe-Brown (1952) argued for the need to conceptualize society as a network of relations between its parts, which he called "social structures." Using Durkheim's work as a starting point, he elaborated the analogy of functions which are performed within its structure (i.e., recurring activities such as funerals, weddings, etc.) giving us the notion of "structural functionalism." In his examination of society, he had a set of problems to solve, which led him to recognize the limitations of the organismic analogy.

By noting these limits in the structural functionalist view, he recognized the processual relationship of mutual influence between the structure and its functions as well as the inherent danger in carrying the analogy of society and organisms to an extreme.

Talcott Parsons (1949) was a prominent social action theorist. He is credited with taking the so-called "voluntaristic theory" of action and steadily making it a more deterministic, eventually assimilating it into his theory of social systems—Social Action Theory, or Action Frame of Reference. Parson's work is considered functionalist by Burrell and Morgan (1979) and Giddens (1976), who wrote: "There is no action in Parson's 'action frame of reference,' only behavior propelled by need-disposition or role expectation."

P. M. Blau (1955), in examining the processes governing human association, attempted to link together the micro- and macro-levels of social analysis. That is to bridge the gap between interactionism and social system theory. Blau subscribes to some of Simmel's "interactionist" theories, but resists his reductionist views of society in favor of a less segmented approach, where human action is viewed as an emerging social process. Fundamental to his work is the notion of social exchange, which is analyzed in terms of power differentiation and status.

Robert Merton (1957) is an integrative theorist, who attempted to link conceptually different theories into a functionalist paradigm. Merton seeks a middle ground in order to link micro- and macro-level of analysis as well as functionalist trying to strengthen some of the weak areas of functionalism.

David Easton (1965), in his book *A Framework for Political Analysis*, espouses the "behaviorist" approach which holds a strong commitment to the assumptions and methods of empirical science. Easton hoped that a common unit of analysis could be found in social theory which could be used in a similar way as molecules in the physical sciences. He states: "The key idea behind this approach has been the conviction that there are certain fundamental units formed and that these generalizations may provide a common base on which the specialized sciences of man in society could be built."

The standard position of the logical empiricists is well summarized in the writings of Carl Hempel. In his book *Frontiers of Science and Philosophy* (1964), Hempel argued strongly for the unity of nomothetic explanation in scientific inquiry. Explanation, he posited, was the same in all scientific endeavors. He writes:

> [T]he nature of understanding, in the sense in which explanation is meant to give us an understanding of the empirical phenomena, is basically the same in all areas of scientific inquiry; and that deductive and the probabilistic model of nomological explanations accommodate vastly more than just the explanatory arguments of, say, classical mechanics: in particular, they accord well also with the character of conscious and subconscious motives, and the ideas and ideals on the shaping of historical events. In so doing, our schemata exhibit one important aspect of the methodological unity of all empirical science.

The Arrival of the Contemporary Critics

Logical positivism, for all its attempts at providing a unifying basis for science, could not overcome a number of fundamental criticisms which were leveled against it by a variety of critics. These criticisms are fairly diverse and do not fit neatly into any compartmentalized scheme. Perhaps the best source for an overview of the criticisms is in Suppe (1977), who listed positivism failed in its claim to provide observation reports which were theory-independent of the theoretical level. Both Quine and Achinstein have pointed out that the separation of observable from theoretical is extremely problematic; in fact, it is unlikely that observation can be theory-free. (See Hesse's [1980] insightful treatment of the theory-free argument.) Second, logical positivism's attempt at grounding the scientific method on deductive reasoning to overcome the so-called "problem of induction" has proved unsuccessful. The problem of induction, simply put, is that no matter how many sample instances are viewed, there is no way to infer that a given law is true. Laws, therefore, cannot be verified through the testing of deduced inferences. The dismissal of inductive reasoning is a mistake; particularly considering that the practice of science since the 17th century has proceeded reasonably well using inductive reasoning. Simply stated, one of the major failings of logical positivism was its disregard for the history of science; in particular, the way scientists *actually* work. It was overly concerned with normative theory development and explanation, too little concerned with viewing science as a more pragmatic activity (cf. Toulmin 1953 and Polanyi 1958). To have a better appreciation of a more pragmatic view of science, many philosophers turned to Peirce.

Charles Peirce (1839-1914), although a philosopher of the 19th century, had a considerable influence on many 20th century philosophers of science who were critical of logical positivism (cf. Habermas, Apel, and Radnitzky). For Peirce, science was not "systematized knowledge" but rather the activities performed by individuals to acquire knowledge. Because of this, he felt it was important to understand the process of scientific activity, including the motives of the scientists themselves. Science needed to be conceived of as "a living historic entity." In contrast to the logical positivists, Peirce thought science should place as much emphasis on the processes of discovery as with how theories are justified. Science embraced a dialectical interaction between these two. Moreover, the method of science was considered by Peirce to be an historic attainment, a scientific achievement in itself. Peirce used Kant's notion of "pragmatic" to reflect his conception of science.

Peirce's contention that science is a human activity which takes place in an historical context gave rise to what Suppe (1977) calls "historical realism." This is an epistemological development which attempts a reformation of the notion that knowledge is related to one's perspective or world view (*weitanschauung*) and therefore inextricably bound up with one's historical and cultural situation. Science, in this context, produces the best alternative for bringing belief closer to reality—hence the notion of "historical realism." The philosophers most closely connected with this point of view are Lakatos, Radnitzky, Toulmin, and Laudan. Each looks at science from a slightly different perspective but there is great similarity in how science is conceived, particularly in terms of how knowledge is incrementably advanced through history.

A third major problem with logical positivism is related to the basic issue of *values*. One of the fundamental pillars of positivist thought (including the latter refinements) is that the process of scientific inquiry is (or should be) value-free. The scientist must keep his values separate from his inquiry. The logical positivists felt there was a clear distinction between fact and value. Scientists must confine themselves to empirical-based studies of the facts; moral or political issues (values) are to be excluded. Many contemporary critics strongly disagree. Gouldner (1962), for example, suggests that not only is it impossible to keep values out of social science inquiry, it ought not to be tried. Social scientists have a duty not to retreat from involvement in social issues and political practice. An apparent detachment by the researcher only seeks to further obscure underlying values. Under the guise of neutrality, the researcher is in fact tacitly supporting the status quo. Fay (1975) argues vociferously: "The conventional practice of viewing knowledge on the one hand, and the use of knowledge on the other, as conceptually distinct is fundamentally misguided." Fay feels this point is rather apparent yet is ignored by mainstream social science, where the main concern is with methodological questions only. This naïve view of science has caused the growth of Critical Theory—found in the writings of the Frankfurt School, which has a rich history (see, for example, the works of Gramsci, Lukacs, Marcuse, Horkheimer, Adorno, Fromm, and Habermas).

Another writer who is critical of the value-free position is Mary Hesse (1978), who suggests values play an important role in developing theories in social science. She contends that theories are not *fully* determined solely by facts. Value judgements are needed for selecting theories for attention. She writes: "The proposal of a social theory is more like the arguing of a political case than like a natural science explanation."

Some of the other prominent writers critical of the logical positivists' position are as follows.

Wittgenstein's (1953) well known criticisms of logical positivism provided the basis for further attacks on its fundamental beliefs by many other commentators. In *Tractatus*, Wittgenstein postulated that there existed some words in language which directly named parts of reality. But not long after it was published and widely acclaimed, Wittgenstein began to doubt that such a relationship was possible. It occurred to him that the meanings of words were determined by the contexts in which they were used. The reason why certain words were understood between individuals was because they shared similar world view or "language game." Meanings were intersubjectively determined, not given. They are inextricably bound up with social activity (cf. Whorf's thesis). Wittgenstein's dramatic change, discussed in *Philosophical Investigations* (1953), has been seen as the impetus behind the writings of many contemporary critics (cf. Feyerabend, Kuhn and Lakatos). For Wittgenstein, the meanings of words in language are obtained from the language games in which they participate. Thus, all observation statements are theory-dependent, not statements of "reality."

Moreover, the truth of observation—or science in general—is related to an individual's language game. And Wittgenstein would contend there is a plurality of truths. For the social scientist, the task is one of elucidating the values, propositions, beliefs, etc., which are felt to be true within a particular communication community or language game.

Peter Winch challenges the belief in the unity of the scientific method. In *The Idea of a Social Science* (1958), Winch argues the need to consider the special differences which exist between the natural and social sciences. He repudiates Mill's view that human behavior could be predicted and generalized. For Winch, human action inherently involves social meaning. As such, the researcher can only truly understand this "from the inside." It is not simply a matter of observing it from the outside as is done in the physical sciences.

C. Wright Mills (1959) was critical of those social scientists trying to adapt methodologies of the natural sciences to the social sciences. He felt they let methodological concerns dominate their work and coined the expression "abstracted empiricism" to describe it. Put concisely, abstracted empiricism is the use of nomothetic methodology to test a theory, which ontologically embraces a subjectivist theory of human nature.

Alfred Schutz (1899-1959) was greatly influenced by Weber and Husserl; he tried to apply the concept of phenomenology to sociological problems. Schutz contended Weber"s concept that the main function of the social scientist was to interpret did not go far enough. He felt the main characteristics of the social science must be "understanding," "subjective" meaning and "action." Schutz looked for meaning in the "stream of consciousness," a concept modeled after Bergson, which eventually developed into his concept of "reflexivity." Reflexivity, simply put, is the ideal that only through retrospective examination can meaning be attached to an experience. He applied this notion in his theory of typification, which enables one to understand the behavior of others.

H. Gadamer (1965) reshaped the hermeneutic position by examining the circle of understanding (Dilthey). He argued it is not a "methodological" circle, as previously felt, but a description of "an ontological structural element of understanding itself." Gadamer sees language as the transmitter between actual experiences, traditions, etc., and the process of understanding. Language takes on an ontological role, shifting his view of hermeneutics nearer the phenomenological realm. Language ceases to be a mere system of sounds and symbols—it becomes the expression of being.

Jurgen Habermas (1971) is a prominent exponent of contemporary critical theory. Habermas was critical of interpretative sociology and sociological positivism—he sees them as self-serving and inadequate. His own notion of critical theory is adapted from Parsonian system theory and Gadamer"s hermeneutics with additional elements taken from psychoanalysis. Habermas is deeply interested in language; its use and structure, and how these formulate and affect society. His theory of "communicative competence" uses elements of hermeneutics to bridge the political macro-structure of speech, and speech within the context of symbolic interaction. In his analysis of communication, he identifies the need for an "ideal speech situation," which is free from "communicative distortion." For Habermas, work is seen as a kind of "communicative distortion" characterized by an asymmetric choice in the use of speech acts, a reflection of unequal power and relationships. The alternative is "interaction," which is based on communicative action between individuals where shared norms are developed and reflected in an intersubjectively shared language. For this to happen, social action must be "emancipated" and free from domination. The ideal speech situation provides the context through which "interaction" is made possible.

Michael Lessnoff, like Winch, does not think the logical "positivists" model is appropriate for the social sciences. This is because the subject matter of the inquiry is social in nature and involves such mental phenomena as thinking, meaning, purposive action, and categorization. Because people have conscious minds and free will, the model of physics is inappropriate for providing an understanding of human behavior. Lessnoff, in his *The Structure of Social Science* (1974), argues that one could study human beings using the model of physics by disregarding the mental aspects of behavior in favor of the physical, but this is not desirable. He writes: "Undoubtedly human beings could be scientifically studied on this basis—but not, I believe *as* human beings, and certainly not as social beings." Social science needs to be interpretive, understanding the mental aspects associated with social action.

Peter Reason and John Rowan (1981), like Lessnoff and Winch, challenge the notion that the logical positivists' scientific method is appropriate for the social sciences. In their book *Human Inquiry*, they argue that much of the current orthodoxy is open to severe criticism—particularly as it relates to the study of human beings. Their eighteen point criticism presents a practical view of the problems with orthodox science. For example, the orthodoxy's "model of the person" is too simplistic. They write: "People are seen as alienated and self-contained, stripped of all that gives their action meaning, and in this way they are trivialized." Moreover, there are problems with its epistemological stance. They state:

> The whole language of "operational definitions," "dependent and independent variables," and so forth is highly suspect. It assumes that people can be reduced to a set of variables which are somehow equivalent across persons and across situations, which doesn't make any sense to us.

Burrell and Morgan (1979) are of similar mind. In a general statement about science, they write:

> Science is based on "taken for granted" assumptions, and thus, like any other social practice, must be understood within a specific context. Traced to their sources, all activities which pose as science can be traced to fundamental assumptions relating to everyday life and can in no way be regarded as generating knowledge with an "objective," value-free status, as is sometimes claimed. What passes for scientific knowledge can be shown to be founded upon a set of unstated conventions, beliefs and assumptions, just as everyday, common-sense knowledge is. The difference between them lies largely in the nature of rules and the community which recognizes and subscribes to them. The knowledge in both cases is not so much objective as shared….Scientific knowledge here is in essence socially constructed and socially sustained; its significance and meaning can only be understood within its immediate social context.

The Emergence of Post-Positivism

During the past few years, a growing number of researchers have begun to argue the need for a change in direction. Most are engaged in social science research and feel orthodox science is not appropriate for their subject of study. Conferences have been held, books written, special issues of mainstream social science journals published, all on this subject. (The present colloquium, to a large extent, is part and parcel of it as well.) This new breed of skeptics is coalescing and arguing for supplanting positivism in favor of a new conception of science. Some have referred to it as "post-positivism" (cf. Giddens 1978, Koch 1980, and Polkinghorne 1983). It asserts the need to do away with the physical model as the only accepted vehicle for knowledge acquisition, particularly for the social sciences. It hopes to transcend the limitation of positivism. It challenges the tradition that knowledge is actually apodictic, asserting instead that knowledge claims are simply those accepted by the community. They possess the power to convince the community that they are in fact an improvement on our previous understanding. Post-positivism is more a belief about knowledge, it is not a particular school of thought with any agreed set of propositions, or tenets although perhaps that is something the IS community might wish to pursue.

An interesting part of post-positivist thought is its belief in what might be termed "methodological pluralism," the assertion that there is no one correct method of science but many methods (cf. Morgan 1980; Polkinghorne 1983). The "correct" one is contingent on the problem to be studied, the "kind" of knowledge desired, and so on. Kuhn (1970) argues this point strongly:

> The pull towards a single methodological perspective designed for research in "normal science" overlooks the anomalous unity of human experience. The difficulty for human science arises not from the need to change from one paradigm to another but the need to resist settling down any single paradigm.

Methodological pluralism is one theme we can and should all support regardless of our epistemological biases. This paper has sought to make the case for methodological pluralism irresistible.

References

Brown, S.; Fauvel, J.; and Finnegan, R. (eds.). *Concepts of Inquiry*, London: Open University Press, 1981.

Burrell, G., and Morgan, G. *Sociological Paradigms and Organizational Analysis*, London: Heinemann, 1979.

Clegg, S., and Dunkerley, D. *Organization, Class and Control*, London: Routledge and Kegan Paul, 1980.

Durkeim, E. *The Rules of Sociological Method*, New York: Free Press, 1938.

Easton, D. *A Framework for Political Analysis*, Englewood Cliffs, NJ: Prentice Hall, 1965.

Fay, B. *Social Theory and Political Practice*, London: George Allen and Unwin, 1975.

Giddens, A. *New Rules of Sociological Method*, London: Hutchinson, 1976.

Giddens, A. "Positivism and Its Criticisms," in *A History of Sociological Analysis,* T. Bottomore and R. Nisbet (eds.), London: Heinemann, 1978.

Gouldner, A. "Anti-minotaur: The Myth of Value-free Sociology," *Social Problems* (9:3), 1962.

Hempel, C. "Explanation in Science and History," in *Frontiers of Science and Philosophy*, R. Colodny (ed.), London: George Allen and Unwin, 1964.

Hesse, M. "Theory and Value in the Social Sciences," in *Action and Interpretation: Studies in the Philosophy of Social Interpretation*, C. Hookway and P. Pettit (eds.), Cambridge: Cambridge University Press, 1978.

Hesse, M. "Theory and Observation," in *Revolutions and Reconstructions in the Philosophy of Science*, M. Hesse (ed.), Bloomington, IN: Indiana University Press, 1980.

Holton, G. "On Being Caught Between Dionysians and Apollnians," *Daedalus* (103), Summer 1974.

Ivanov, K. "Systemutveckling och adb-amets utveckling," Department of Computer Science Report LIU-1DA-R-84-1, Linkoping University, Sweden, June 1984.

Koch, S. "A Possible Psychology for a Possible Post-positivist World," paper presented at the 88th Annual American Psychological Association Conference, Montreal, September, 1980.

Koestler, S. *The Act of Creation*, New York: Macmillan, 1969.

Kolakowski, L. *Positivist Science*, Harmondsworth, United Kingdom: Penguin Books, 1972.

Kuhn, T. *The Structure of Scientific Revolutions*, 2nd edition, Chicago: University of Chicago Press, 1970.

Laudan, L. *Progress and Its Problems: Towards a Theory of Scientific Growth*, London: Routledge and Kegan Paul, 1977.

Lessnoff, M. *The Structure of Social Science*, London: George Allen and Unwin, 1974.

Mill, J. *A System of Logic*, London: Longmans, 1843.

Morgan, G. "Paradigms, Metaphors and Puzzle Solving in Organization Theory," *Administrative Science Quarterly*, December 1980.

Payne, R. "Truisms in Organizational Behavior," in *Interpersonal Development,* F. Massarik (ed.), Basel, Switzerland: S. Karger, 1976.

Perrow, C. "The Short and Glorious History of Organizational Theory," *Organizational Dynamics*, Summer, 1973.

Pettigrew, A. "Contextualist Research and the Study of Organizational Change Processes," in *Doing Research that is Useful for Theory and Practice*, E. Lawler and S. Fransico (eds.), San Francisco: Jossey-Bass, 1985.

Polany, M. *Personal Knowledge: Toward a Post-Critical Philosophy*, Chicago: University of Chicago Press, 1958.

Polkinghorne, D. *Methodology for the Human Sciences: Systems of Inquiry*, Albany, NY: State University of New York Press, 1983.

Popper, K. *Conjectures and Refutations*, London: Routledge and Kegan Paul, 1963.

Popper, K. *Objective Knowledge*, Oxford: Oxford University Press, 1972.

Reason, P., and Rowan, J. (eds.). *Human Inquiry: A Sourecebook of New Paradigm Research*, Chichester, England: J. Wiley & Sons, 1981.

Scruton, R. *A Short History of Modern Philosophy: From Descartes to Wittgenstein,* London: ARK Paperbacks (Routledge and Kegan Paul), 1984.

Suppe, F. "The Search for Philosophical Understanding of Scientific Theories," in *The Structure of Scientific Theories*, 2nd ed., F. Suppe (ed.), Urbana, IL: University of Illinois Press, 1977.

Snyder, P. *Toward One Science: The Convergence of Traditions*, New York: St. Martin's Press, 1978.

Toulmin, S. *The Philosophy of Science: An Introduction*, London: Hutchinson, 1953.

Toulmin, S. *Human Understanding: The Collective Use and Evolution of Concepts,* Princeton, NJ: Princeton University Press, 1972.

Winch, P. *The Idea of a Social Science*, London: Routledge and Kegan Paul, 1958.